WHAT IS CLAIMED IS:

1. A method for assessing noise generated during combustion in an internal combustion engine, such method comprising:

determining a noise index by processing a signal generated in a cylinder of such engine in accordance with a shift invariant wavelet transform.

2. The method recited in claim 1 wherein the noise index, NI_{WVL} is:

$$NI_{WVL} = 20 \bullet \log_{10}\left(\frac{c}{n} \bullet \sqrt{\sum_{j_m} \frac{1}{2^{j_m}} \sum_{k} \left|\gamma_{j_m,k}\right|^2}\right)$$

where c is a constant used for scaling, n is the number of samples of the pressure signal being transformed, j_m indicates the j_mth level of the shift invariant wavelet transform, and k is the running index.

3. The method recited in claim 1 wherein the signal is processed to assess pilot combustion noise associated with pilot injection.

4. The method recited in claim 3 wherein such pilot combustion noise assessment is made by considering only that part of the pressure signal lying in a crank angle interval between start of injection for pilot injection and for main injection.

5. A method for assessing noise generated during combustion in an internal combustion engine, comprising determining a noise index by processing samples of a signal generated in a cylinder of such engine in accordance with a shift invariant wavelet transform, such processed samples being only samples taken during a window less than a full engine cycle.

6. The method recited in claim 1 wherein the noise assessment is made during operation of the engine and the noise index is used to adjust fuel injection parameters for the engine.

7. An article of manufacture comprising:

a computer storage medium having a computer program encoded therein for assessing noise generated during combustion in an internal combustion engine, said computer storage medium comprising:

code for determining a noise index, NI_{WVL}, by processing a signal generated in a cylinder of such engine in accordance with a shift invariant wavelet transform.

NI_{WVL} is:

$$NI_{WVL} = 20 \bullet \log_{10}\left(\frac{c}{n} \bullet \sqrt{\sum_{j_m} \frac{1}{2^{j_m}} \sum_{k} \left|\gamma_{j_m,k}\right|^2}\right)$$

where c is a constant used for scaling, n is the number of samples of the pressure signal being transformed, j_m indicates the j_mth level of the shift invariant wavelet transform, and k is the running index.

8. The article of manufacture recited in claim 7 wherein the signal is processed to assess pilot fuel injection noise.

9. The article of manufacture recited in claim 8 wherein such pilot combustion noise assessment is made by such code by considering only that part of the pressure signal lying in a crank angle interval between start of injection for pilot injection and for main injection.

10. An article of manufacture comprising:

a computer storage medium having a computer program encoded therein for assessing noise generated during combustion in an internal combustion engine, said computer storage medium comprising:

code for determining a noise index by processing samples of a signal generated in a cylinder of such engine in accordance with a shift invariant wavelet transform, such processed samples being only samples taken during a window less than a full engine cycle.

11. The article of manufacture recited in claim 7 wherein such storage medium is a semiconductor chip.

12. The method recited in claim 1 wherein the signal is processed to adjust at least one of EGR, VGT angle, and throttle angle to reduce combustion noise.

13. The method recited in claim 12 wherein the engine is a diesel engine.

14. The method recited in claim 12 wherein the engine is a spark ignited gasoline engine.

15. The method recited in claim 14 wherein the signal is processed to adjust at least one of a position of a charge motion control valve, EGR valve, and a throttle angle to reduce combustion noise.

16. The method recited in claim 12 wherein the engine is a HCCI engine

17. The method recited in claim 1 wherein the engine is a HCCI engine and wherein the signal is processed to adjust at least one of a position of a throttle valve, a temperature of the gases in the combustion chamber, and an amount of exhaust gases trapped in the combustion chamber to reduce combustion noise.